A Better Mousetrap: Why Did They Come?

Dr. Mary R. Anderson-Rowland, Arizona State University

Dr. Mary Anderson-Rowland is the PI of an NSF STEP grant to work with five non-metropolitan community colleges to produce more engineers, especially female and underrepresented minority engineers. She also directs two academic scholarship programs, including one for transfer students. An Associate Professor in Computing, Informatics, and Systems Design Engineering, she was the Associate Dean of Student Affairs in the Ira A. Fulton Schools of Engineering at ASU from 1993-2004. Anderson-Rowland was named a top 5% teacher in the Fulton Schools of Engineering for 2009-2010. She received the WEPAN Engineering Educator Award 2009, ASEE Minorities Award 2006, the SHPE Educator of the Year 2005, and the National Engineering Award in 2003, the highest honor given by AAES. In 2002 she was named the Distinguished Engineering Educator by the Society of Women Engineers. She has over 180 publications primarily in the areas of recruitment and retention of women and underrepresented minority engineering and computer science students. Her awards are based on her mentoring of students, especially women and underrepresented minority students, and her research in the areas of recruitment and retention. A SWE and ASEE Fellow, she is a frequent speaker on career opportunities and diversity in engineering.
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Abstract
An Academic Success and Professional Development Class, FSE 394, has been offered for over 10 years for engineering and computer science students at Arizona State University (ASU). Seminars were first held for 22 students with scholarships from one NSF S-STEM program, with an emphasis on females and underrepresented minority students and both transfer and non-transfer students. The seminars have now grown to a required class for credit for some 80 scholarship students, but along the way an increasing number of students without scholarships, especially transfer students have enrolled in the class. In Fall 2012, a record number (by 45 students) 179 students enrolled in the class, challenging the ability of the instructor to continue to provide a personal touch in the course for each student. Several reasons were speculated for this sudden increase in enrollment: increased transfer enrollment in the school, a change in advisement for transfer students, increased word of mouth by satisfied students in the class, or increased advertisement of the course. We wanted to better understand this increase so we could better manage it in the future.

We conducted a closed study as a method to better understand a retention program. In order to understand the sudden swell in students in the course, surveys were given to all of the students in the class. Our primary questions were: “What is the main reason why you enrolled in FSE 394 for Fall 2012?” and “What are all of the reasons why you enrolled in FSE 394 for Fall 2012?” Several reasons were suggested. The results of the survey showed that the most common reasons for enrolling in the course were: 1) required by scholarship, 2) offer of a $300 scholarship for completing the course, 3) advised to take the class by someone who had taken the course, 4) advised to take the course in place of ASU 101 Introduction to ASU, and 5) needed help with academics. Another factor in the enrollment increase was likely the increase in new transfer students in engineering in Fall 2012. A smaller factor was older transfer students who were doing career change. The increase in veteran students was small.

In Fall 2013, the Ira A. Schools of Engineering will no longer require that new transfer students take ASU 101 or an equivalent, but will offer a one-credit, one semester orientation course instead to be taken voluntarily. Hopefully, this will check the increasing FSE 394 enrollment.

I. Introduction
Many programs have been developed to increase the retention of students in engineering and computer science. One of the most successful programs is the National Science Foundation’s (NSF) CSEMS program, now known as the S-STEM program. In 2002 along with a new NSF CSEMS scholarship grant (#01233146) with an emphasis on female and minority students, the author started a seminar to further support the upper division engineering and computer science students with unmet financial need for which it was designed. This program was called CIRC for
Collaborative Interdisciplinary Research Community. Note that henceforth in this paper, “engineering” shall also include computer science since this major is included in the Ira A. Fulton Schools of Engineering at Arizona State University (ASU) and in the program described in this paper. The seminar was held five times a semester for an hour during the first year with 22 (12 transfers) students. From the beginning the seminar was held in a nice carpeted room and refreshments were served to help make the students feel “special”. Since half of the first year’s students were transfer students, the author saw the need for an added emphasis on new transfer students. In 2003 a second NSF CSEMS program (#0324212) called CIRC/METS (Motivated Engineering Transfer Students) was established with scholarships for upper division transfer students. The scholarships were in the amount of $3,150 for an academic year which covered most of tuition at that time. At first we attempted to hold separate meetings for the transfer and non-transfer students, but scheduling was very difficult and soon the students all met together in the same meeting. Some topics were new for both groups, some topics were review for non-transfer students, but all students became supported as the experienced students helped the newer students. Although the seminars were “required”, it was difficult to draw a specific line as to how much participation was required as satisfactory for continuation of the scholarship.

The seminars were later changed to a class so that students had the option of receiving one-semester credit hour. The class has six 75 minute meetings per semester. Students are allowed to miss one meeting per semester which must be made up. Since so many students became involved, individual class makeups was not feasible. One of the presentations for each meeting is recorded and made available to the students on Blackboard for a makeup meeting. The student can watch the video and submit a completed evaluation of the meeting online to receive credit for the class. The students have substantial assignments which need to be turned in during the semester. Assignments are correct or incorrect and the letter grade depends on class attendance and the completion of all assignments by their due date. An example an assignments on career planning is discussed in a recent publication. The credit from the class is calculated into the students’ GPA, but the class credit does not count in the Program of Study. Again, it was difficult to judge the participation of students who were not enrolled in the class. Later all scholarship students were required to enroll in the class as a part of their commitment to the scholarship program. This has proven to be the right step for supporting students. The required course is a type of “tough love” which motivates students to do activities that help their retention and graduation because a grade is at stake. The number for the class was changed from a 200-level to a 300-level (FSE 394), making it clear that this class was for upper division students: non-transfers and transfers in engineering and computer science. Students without scholarships also attended the class due to word-of-mouth on how valuable the class was. In addition, as word of the program spread, we began to receive more qualified applicants for the scholarships than could be awarded. Some of the applicants who did not receive a scholarship at first enrolled in the class and by doing well academically increased their chances of receiving a scholarship the next year. Beginning Spring 2013, at the request of the students, the seminar class changed to have two semester hours of credit. The title has been changed to “Academic Success and
Professional Development” (ASAP). In order to keep the classes small, at first each meeting was held two or three times. Networking is an important part of the course, as well as informal counseling from the program Director, making the small classes necessary. In Fall 2012 we had to go from five to six times for each meeting, as well as hold some parallel sessions, one for seniors and graduate students and the other for students newer to the program. Students are required to take the course each semester that they hold the scholarship, so can take the class multiple times. The assignments change from semester to semester and more is required of repeat students.

The FSE 394 class is now serving transfer students funded by the current NSF CIRC/METS S-STEM grant (#0728695) and by the ASU Women & Philanthropy Organization, graduate students and non-transfer students funded by the current NSF CIRC S-STEM grant (#1060226), and transfer students from five non-metropolitan Arizona CCs funded through an NSF METSTEP grant (#0856834). Scholarships are in the amount of $4,000 (which currently covers 40% of tuition) for an academic year and renewable. Graduate students can receive support for a maximum of four semesters through the CIRC grant if they came up through the program as an undergraduate. The number of scholarship students for Fall 2012 are 35, 27, and 22, for the three programs, respectively. Therefore there were only 86 students who were required to take the ASAP course during Fall 2012. An emphasis in these programs underserved students, primarily females and underrepresented minority students. In general, 60% of the scholarships go to these students.

II. ASAP Course Development
A major curriculum change for the course occurred with the introduction of the “Guaranteed 4.0 Plan” by Donna O. Johnson during the Spring 2006 semester. Up until that time, even with time management instruction, students noted on their evaluation of the course that the program was not helping them academically. The 4.0 Plan is the only system that has been researched and proven to work if students will follow all of the steps of the program. The program is called “guaranteed” because Ms. Johnson has promised to give $100 to any student who follows her program completely and does not receive straight A’s. The most difficult part of the program is to get at least 8 hours of sleep every night. It is well known that adequate rest and a good diet are instrumental for the success of a student. Although some students can pick up on the 4.0 Plan after first hearing about it the first time, most students do not. Many students believe that their own systems work well enough until they get into academic difficulty and then they are usually willing to try something new. The students are given several assignments on the 4.0 Plan in the ASAP course to reinforce its use. At the center of the 4.0 Plan is a dynamic detailed time management schedule which must often be adjusted during the semester. All of the tenets of the 4.0 Plan are covered by a good detailed management schedule, including specific times to work on each course, to meet with the professors in each class, to begin homework the day it is assigned, and do Bullet Point Reading, Bullet Point Notes, and Bullet Point Concepts. Even students with excellent grade points find that they can become more efficient in their studies.
by following the guidelines of the 4.0 Plan. We believe that this system helps most students who commit themselves to following it. Ms. Johnson has yet to give out $100. We believe that use of this system is a major reason why 95% of the students, both transfer and non-transfer, in the ASAP class graduate. To put this accomplishment in perspective, we note that only 70% of all upper division transfer males and 64% of all upper division transfer females graduate.

A major purpose of the class is to help new upper division transfer students (both urban and rural) adjust from the small, cozy confines of a community college (CC) to a large university. A major mistake of new transfer students is to try to take the same course load at the university as they did at the CC. The emphasis on the “Guaranteed 4.0 Plan” helps the students see how they have to plan adequate hours to learn their course material between working hours. Other major topics are: resumes, Career Services opportunities, research, internships, career planning, and graduate school. Networking and mentoring are also important aspects of the class.

Because FSE 394 is an Academic Success and Professional Development course, many students assume that it is an easy way to increase their GPA with little work. Each semester, some students learn the hard way that it is important to keep up in the course and substantial work is required. Each semester a number of students withdraw from the course as they get too far behind or they are struggling in their other classes and feel that dropping this course is the easiest since it is not required in most cases. Even if they drop the course, they have usually learned valuable tips on how to survive well in engineering at ASU.

The ASAP class meets 6 times for each of the six meetings to keep the class size under 30 if possible. It is important to take advantage of the networking potential in this class. Most ASAP classes start with an ice breaker of students introducing themselves, their major, where they are relative to a degree, their transfer school, and answering a question such as “What is your biggest challenge between now and the end of the semester?” When a student hears another student say that they are having trouble in a particular class, the first student is relieved to know that they are not the only person in the class having some difficulties. Transfer students need to be reassured over and over that it is very natural to have difficulties, especially during the first semester or year at a large university. Networking is also enhanced in the small classes by having the students who have been in the program for a time, talk about their internship or research experience which inspires the new students to do the same.

Another change to the course occurred in the Fall 2008 with the introduction of the $300 scholarship as part of the funding for the METSTEP program (#0856834) for transfer students from non-metropolitan CCs. We knew that the ASAP course was helpful for all new transfer students, not just transfer students with scholarships. The transition from a CC to a large university is huge starting with a lack of knowledge of some basic resources. The METS Center for transfer students exists to help transfer students. The METS Director is an excellent source as an informal counselor. The transfer students who work in the Center also serve as informal counselors and can answer many of the transfer student’s questions, however there is even more
knowledge to be gained by taking the ASAP course. Although a few new transfer students without a scholarship took the course and other students took the course due to “word-of-mouth”, students did not clamor to take an extra one credit course which did not count toward their Program of Study. We needed to determine how much of a money incentive was needed to encourage students, especially new transfer students, to take the ASAP course. At first we thought that it would take at least $500 to persuade students that it was worth taking the course. However, due to a limit on the available funding, we first offered a $300 incentive: if transfer students would complete the course, they could earn a $300 scholarship for a maximum of two semesters. At first we did not have a lot of takers although the amount of $300 seemed to be large enough to entice students. As word has spread, more students have taken advantage of this offer. We also received some support for $300 scholarships for the ASAP course for non-transfer students through the last CIRC (#1060226) grant, but because this is NSF S-STEM money, students can receive the $300 scholarship only if they qualified for the CIRC scholarship. $300 scholarships now require that the student earn an A in the course. The number of students earning the $300 scholarship has grown from about five a semester to 26 transfer and 4 non-transfer students in Spring 2012. In Fall 2012 over 50 students qualified. Most students have stated in evaluations that if they had understood how much the course would help them, they would have taken it for free. However, this is hindsight.

For several years, all new transfer students have been sent emails telling them of the scholarships available, as well as the class to help them in their transition. During the last couple of years, the enrollment in this class has suddenly ballooned in attendance. The enrollment for the past several semesters has been 98, 107, 121, 134, and now 179 for Fall 2012. Eleven of the 179 students withdrew before November and another 6 withdrew in November and December, probably because they were behind on the assignments. All but three of the students who withdrew were new to the course. Of the students who completed the course, 89 students were new to the class and over 40 of these were transfer students new to the university.

The large increase in the class for Fall 2012 was rewarding in that many more transfer students received extra help in their transition to the university. On the other hand we were not prepared for this sudden increase and this number was actually too large for one instructor to be able to work with all of the students on an individual basis. We had to increase the number of times available for each meeting from five to six, as well as hold some parallel sessions to separate topics for new students and continuing students. In an attempt to get to know each of the students, the instructor met for at least 30 minutes with each student by appointment. During the semester she was able to meet with 151 of the students and learn some fantastic stories of courage and commitment. If this number of students were to continue for this class, changes needed to be made. Through these discussions with students, when asked why they were taking the ASAP course, it became clear that one reason there were so many additional students in the class was due to a change in advisement in one of the ASU Schools of Engineering. Therefore, we set out to understand more precisely why there was the large influx of students.
III. Possible Factors Affecting the FSE 394 Class

During the one-on-one meetings with the FSE 394 students during Fall 2012, the instructor often asked the student why they were in the FSE 394 class, what they expected from the course, and if the course was helping them. To her surprise, several students said that as a new transfer student, they had been advised to take this FSE 394 class in lieu of ASU 101, an introductory one-credit orientation course for freshmen, which is required by some majors of all new students in the Ira A. Fulton Schools of Engineering. The ASU 101 course grade is included in the GPA, but does not count as general studies credit in the Program of Study for a degree. Apparently the advisors felt that the FSE 394 course aimed at upper division students would be of more value to the transfer students who were often quite a bit older than the usual freshman age. The students said that they were glad to be in the FSE 394 class rather than with freshman students and seemed very satisfied with the information they were gaining from the class. Several of these students were also in ASU 101 orientation course not having been told that FSE 394 is a substitute course. These transfer students expressed some agitation at working with freshmen whose interests seemed focused solely on what went on in the dorm the night before or what TV program was on. Many of the new transfer students who were doing a substitute course for ASU 101 were students in Industrial Engineering, Computer Engineering, or Computer Science. These majors all have the same Advising Center in the School of Computing, Informatics, and Decision Systems Engineering. Although some of these students had been referred to the FSE 394 class in the past, apparently now all new transfer students in this School were being advised to take the FSE 394 course. This did not seem to be true for other majors in engineering.

An additional factor that should be noted is that the number of new transfer students into the Ira A. Fulton Schools of Engineering had a notable increase in Fall 2012 with 440 new transfer students compared to only 334 in Fall 2011. Therefore, because part of the increased enrollment in FSE 394 was probably just due to the fact that there were more new transfer students that needed some type of introductory orientation class. Noticeably in the Fall of 2012, a larger percentage of students in the FSE 394 class were older, Caucasian males. During the interviews, a theme seemed to emerge. With the economy downturn around 2008, several Caucasian males, who either lost their employment or realized that they were in a dead end job, decided to go to college for a degree in engineering. They began their journey at the community college. Now after two or three years or more, they had transferred to ASU to continue on to their engineering degree. A few of these students were veterans, so we were interested in learning if there was an unusual number of veterans earning engineering degrees, perhaps related to work that they did in the military.

IV. The Survey
A survey was taken of all of the students in the Fall 2012 ASAP class to determine the major causes of the enrollment increase in FSE 394. We were interested in knowing what semester they were in at ASU and we wanted to know which of several possible factors influenced them
The students were asked a major question:

Why did you take FSE 394 Academic Success this Fall 2012 semester? Please check all that apply. Put a star by the most important reason.

___a. Had to take course because I have a $4,000 scholarship
___b. Because I can earn a $300 scholarship if I complete the course
___c. Was told to take FSE 394 instead of ASU 101 by an academic counselor
___d. Received email telling about the course
___e. Was encouraged to take the course by a student in the course or who had taken the course
___f. Heard about it at the METS Center/happened to stop by
___g. Heard about the class at the engineering orientation
___h. Heard about the class at the School/Department orientation
___i. Had taken class before: I liked the course so I took it again.
___j. Needed help with my academics
___k. Needed one hour to be a full-time student
___l. Heard about the course from a student at the community college
___m. Heard about the course from a faculty/staff member at the community college
___n. Sent by an advisor to improve my grades
___o. Other: Please list:

The data is also analyzed according to age and gender. It seemed that in Fall 2012 a new type of student was present in larger numbers: males over 25 now pursuing their first degree in engineering. The results of this study are analyzed to help guide future advertisement of the program as well as to make program improvements.

Three surveys were taken of the FSE 394 students during the Fall 2012 semester. The sample size varies somewhat depending on the number of students who responded to a particular survey.

V. The Survey Results

First, in order to have a better idea of how many of the students were new to ASU, which would mean new transfer students, a major focus of the program, we determined what semester at ASU Fall 2012 was for the students in the FSE 394 class that semester. The results are in Figure I.

As can be seen from Figure I, most students enter the FSE 394 class in the Fall (the odd number of semesters). More new transfer students first enroll in engineering in the fall rather than the spring. Students that start ASU as freshmen and spend their first two years in a lower division S-STEM academic scholarship program enter the FSE 394 course at the beginning of their junior year. This helps to account for the higher of numbers of students who are in their fifth semester at ASU, as well as the number of transfer students who take five or six semesters to graduate with a bachelor’s degree. Figure I does show the high number of first semester transfer students who were in the class in Fall 2012. The student survey which asked the students which ASU
semester (not counting summers) this was for them was answered by 176 students. Of these students, 147 (83.5%) were transfer students and 29 (16.5%) were non-transfer students.

We had 176 (98.3%) out of 179 students respond to the initial survey given to the Fall 2012 ASAP class. From this survey we learned that only 8 (4.5%) of the students were veterans, all male with 6 Caucasians and 2 Hispanics. Therefore our enrollment increase was not due to a large influx of veteran students. From that same survey we determined the ages of the students in this Fall 2012 class as follows in Table I:

<table>
<thead>
<tr>
<th>Age</th>
<th>18-20</th>
<th>21-23</th>
<th>24-26</th>
<th>27-30</th>
<th>31-35</th>
<th>36-40</th>
<th>41+</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>24</td>
<td>9</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td></td>
<td>46 (26.1%)</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>47</td>
<td>41</td>
<td>19</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td></td>
<td>130 (73.9%)</td>
</tr>
<tr>
<td>All</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>176 (100%)</td>
</tr>
</tbody>
</table>

Table I. Ages of Students Enrolled in FSE 394 Fall 2012 by Gender.

It can be seen that the ages of the males are somewhat older than the females. Only 7 (15.2%) of the females are over 26, while 26 (20%) of the males are. Of the males over 26, 19 (73%) these are Caucasian, thus giving credence to the impression that were quite a few older Caucasian men. All of the students over 25 are transfer students.
In addition, we characterized the class transfer students by gender and ethnicity. The percentage of females in ASU engineering is 18.6% and 14.9% among upper division transfer students. The percentage of females in the class was over 26. We were also able to over represent underrepresented minority students. The percentage of underrepresented minority students in ASU engineering is 22.4% and 21.3% among upper division transfer students. The percentage of minority students in the FSE 394 class was nearly 36%. The percentage of underserved students in FSE 394 in Fall 2012 was 54%. Usually 60% of the scholarship holders are underserved students. Only 84/179 = 54% of the students enrolled in Fall 222012 were $4,000 scholarship recipients.

<table>
<thead>
<tr>
<th>2012</th>
<th>Female</th>
<th>Male</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minority</td>
<td>14</td>
<td>49</td>
<td>63 (35.8%)</td>
</tr>
<tr>
<td>Non-Minority</td>
<td>32</td>
<td>81</td>
<td>113 (64.2%)</td>
</tr>
<tr>
<td>Totals</td>
<td>46 (26.1%)</td>
<td>130 (73.9%)</td>
<td>176 (100%)</td>
</tr>
</tbody>
</table>

Table II. Gender and Ethnicity Distribution of 2012 Survey Transfer Students Enrolled in the Academic Success and Professional Development Class

Next we wondered why the students were enrolled in FSE 394. There are many reasons for a student to enroll. We asked the students to identify all of the reasons for which they took the course and then to indicate the main reason. Figure II gives the main reason.

![Figure II. Main Reason Student Enrolled in FSE 394 for Fall 2012.](image)

From our sample of 141 students (78.8% response), the main single reason for being enrolled in FSE 394 for Fall 2012 was, as expected, because they were the recipient of a $4,000 scholarships
and were required to take the course. In this sample, 48.2% of the students said that having a scholarship was their main reason for being in the course. Surprisingly though, the second largest main reason (10.6%) was because the student had been encouraged to take the course by a student in the course or who had taken the course. We knew that word-of-mouth was a good advertiser for this course. Only twelve students (8.5%) said that being told to take the course instead of ASU 101 by an academic counselor was their main reason for taking the course. Other reasons for taking the course were: to earn a $300 scholarship (5.7%), had taken the class before and liked it (5%), and heard about the class at the Fulton Orientation (4.3% each). A few students were in the class to help raise their GPA (5%) and two students were sent by their advisors to help raise their GPA (1.4%). Two students used the course of one hour to make them a full-time student, four students heard about the program from various sources, and only three students attended mainly because they had received an email about the course. A few other students were in the class due to other reasons.

If we look at all of the reasons for which the students took the class, we get a slightly different picture as can be seen in Figure III. A little over 50% of the students in the class had a scholarship. Although only 48.2% of the survey students said that the scholarship was their main reason for taking the course, we see that actually 73 (51.8%) of the survey students had a scholarship and were required to take the course. In the survey, 32 students (22.7%) mentioned earning a $300 scholarship as a factor for taking the course, although only 9 students said that it

![Figure III. All Reasons Why Students Enrolled in FSE 394 in Fall 2012.](image-url)
was the main reason. The survey results suggest that some of the students thought that they could earn a $300 scholarship in addition to their $4,000 scholarship, which is not the case and has been clarified in class. Among all of the reasons, the $300 was the second most often mentioned factor instead of the fourth largest main factor. Interestingly, 22 students said that they were told to take FSE 394 instead of ASU 101 while only 12 students said that it was the main reason. Being told by another student to take the course is still a more common reason for taking the ASAP course than being told by an academic counselor. Seventeen students said they were repeating the course because they liked it, but only seven students said this was the main reason.

VI. Analysis
Our research into determining the cause of the sudden increase in students in FSE 394 for Fall 2012 did not answer the question conclusively. We did find that that 64 of the survey students were first semester transfer students and that 147 (83.5%) of the 176 students who responded to the survey were transfer students. So it is safe to say that the majority of the increase in the class was due to new transfer students. The question is why they were taking the class.

One of our theories was that there may have been a large influx of veterans. This was not true, since only 8 (4.5%) of the students were veterans.

Another theory was that there were now more older Caucasian males in school due to the economy dip about three or four years ago. The survey showed that all of the students over 25 were males. Of the 26 males over 26, 19 (73%) these are Caucasian, thus giving credence to the impression that there were quite a few older, Caucasian men. It would seem that part of the increase of students in the class was due to men returning to school to get a degree after having worked for a time.

We also hypothesized that there was an increase in ASAP enrollment due to academic advisors telling transfer students to take the class. Table III shows the ASAP class students by major and also the number in each major who were advised to take the FSE 394 class in place of ASU 101.

<table>
<thead>
<tr>
<th>Major</th>
<th># Students</th>
<th># Students Told to Take FSE 394 for ASU 101</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS, CSE, IE</td>
<td>43 (30.5%)</td>
<td>17 (39.5%)</td>
</tr>
<tr>
<td>MAE</td>
<td>33 (23.4%)</td>
<td>3 (9.1%)</td>
</tr>
<tr>
<td>EE</td>
<td>22 (15.6%)</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>CHE</td>
<td>13 (9.2%)</td>
<td>1 (7.6%)</td>
</tr>
<tr>
<td>CE</td>
<td>13 (9.2%)</td>
<td></td>
</tr>
<tr>
<td>Materials</td>
<td>8 (5.7%)</td>
<td></td>
</tr>
<tr>
<td>BME</td>
<td>7 (5.0%)</td>
<td></td>
</tr>
<tr>
<td>Constr. Engr.</td>
<td>1 (0.7%)</td>
<td></td>
</tr>
<tr>
<td>Applied Math</td>
<td>1 (0.7%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>141 (100.0%)</td>
<td>22 (100 %)</td>
</tr>
</tbody>
</table>

Table III. Number of Survey Students by Major and If They Were Told to Take FSE 394 in Place of ASU 101.
It would appear from Table III, that our proposal that more of the CS, CSE, and IE students had been advised by their advisors was correct. The offer of a $300 scholarship was a reason for over 30 of the students to enroll showing that this feature of the program is a draw and that more students are learning about this scholarship. ASU 101 is a course listed in their course plan. The proportion \((17/43=39.5\%)\) of CS, CSE, and IE students who were told to take FSE 394 in place of ASU 101 is statistically significantly larger than the proportion of MAE students \((3/33=9.1\%)\) with a \(p=.001\) and therefore larger than all of the other majors. The academic advisors seem to have done a very good job of sending new transfer students to FSE 394.

Eighty-four of the students enrolled in FSE 394 in Fall 2012 had scholarships and were required to attend the class, so we expected the scholarship to be the main reason the student was attending the class. The offer of a $300 scholarship was a factor for over 20 students taking the course, although only 6 students said that it was the main reason. More students took the course on the recommendation of another student than students who took the course on the advice of an academic advisor. However, it would appear that student increases in the program came from both of these sources. Although only nine students said that the main reason they took the course was due to an academic advisor, 15 students said that this was one of the reasons they took the course. Although data has not been taken on this factor, this appears to be a new type of student taking the FSE 394 class. However, 15 students only account for part of the increase of over 40 students for Fall 2012. It would seem that learning about the class from friends and through advertisement at the community college, at the Schools orientation, and at the METS Center have all combined to help increase the class.

**VII. Summary and Future Work**

Although not definitive, the increase of 45 students may be partly due to the fact that there was an increase of over 100 new transfer students in the Ira A. Fulton School of Engineering in Fall 2012 over Fall 2011. As expected the most mentioned and the leading main reason for students to be enrolled in the course is because their scholarship requires it. A second most mentioned reason for students enrolling in the class was the offer of a $300 scholarship. This scholarship has been offered for several years, but the number of students claiming it is increasing each semester. Our best program advertisement is through word-of-mouth from students who have taken the course and praise it highly. This reason was the third most often mentioned reason for enrolling in the course. We have learned that part of the increased enrollment in FSE 394 in Fall 2012 was due to increased academic advisement for transfer students to take this course in place of ASU 101 (fourth most often mentioned reason for taking the course). We know that this was true for 17 \((31.3\%\) of all transfer students in FSE 394) transfer Industrial Engineering, Computer Systems Engineering, and Computer Science majors who are all advised from the same office. However, more students took the course due to the advisement of others than advisors, most notably students who had taken the course. Another new group to note is the 19 students who said they were looking for help with their academics \((ranked \text{ the fourth most mentioned reason})\). A smaller factor in the class size increase, but nonetheless noteworthy, was an increase in older
students changing careers into engineering. A few students took the one hour class because they needed just one more hour to be full-time for scholarship or loan purposes. Since the class has now been changed to two-credits, fewer students in the future may take the class for this reason.

A concern with the sudden increase was that the class might continue to increase in the future. A class of over about 135 is difficult to maintain in terms of small class meetings, networking, mentoring, and information advising. In addition, it is difficult to find speakers who are willing to do more than three presentations on a Thursday and three more on a Friday. Fortunately for both those directing FSE 394 and for future transfer students, plans have been made to offer an upper division one semester credit class starting in Fall 2013 in engineering for all new transfer students. This class will not have any scholarship associated with it and will focus on assisting new transfer students in university adjustment in their first semester. It is expected that the ASU 101 course will no longer be required of any transfer students and attendance in the new one semester course is voluntary. Students would not repeat this class. We are delighted that some of the work we have been doing with transfer students has become sustainable (without scholarships) through the engineering school.

It is anticipated that many of the new transfer students will choose the one credit class, therefore keeping the enrollment in FSE 394 in check. At the same time, new transfer students with scholarships will continue to take FSE 394, as well as some transfer students who are interested in receiving a scholarship the next round or transfer students who are more serious about getting all the help they can in adjusting to a large university. Since the FSE 394 course can be taken multiple times, some students who take the one semester transfer course may wish to take the FSE 394 class the next semester or at a later time.

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References
